A VU-1 JD-1 photo mapping aircraft passes over Hawaii in November 1958.

Said Davidson, "Acceleration and deceleration were slightly less than in a conventional-type aircraft but there was no torque trouble, less noise, and speed and altitude were easy to maintain."

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The Naval Research Lab was active utilizing the once-feared German V-2 rocket for experiments. Marking an incipient stage of space study, miniature laboratory type equipment was installed in the nose of the rocket and fired by Army ordnance technicians at White Sands, N.M.

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Flying in 1946 were a pair of new jet fighters, the Vought XF6U-1 and North American's XFJ-1, the latter destined for great success in the air. The Naval Air Test Center (NATC), Patuxent River, Md., was the scene for much of the experimental work. Key problems with the new planes involved use of drag devices to enhance takeoff and landing characteristics. There was concern for the jet engine's slow response to throttle adjustments compared to its piston-engine counterparts.

Procedures called for the pilot to "take the cut" aboard the carrier just as in propeller planes. The engine's "spool up" time had to be taken into account when boltering or waving off. Eventually, jet pilots would be taught to fly their aircraft all the way "into the wires" with power on.

Tricycle landing gear on the jets presented some carrier operating problems. The prop types invariably featured conventional tail-sitting wheel arrangements. Deck crews had to readjust their thinking. Barrier arrangements had to be revised due to the tendency of the jets to slam down on the nose wheel after the hook had engaged the wire. All hands knew, however, that the jets were here to stay. The recips would not disappear but they were destined to share flight lines and flight decks with the streamlined newcomers.

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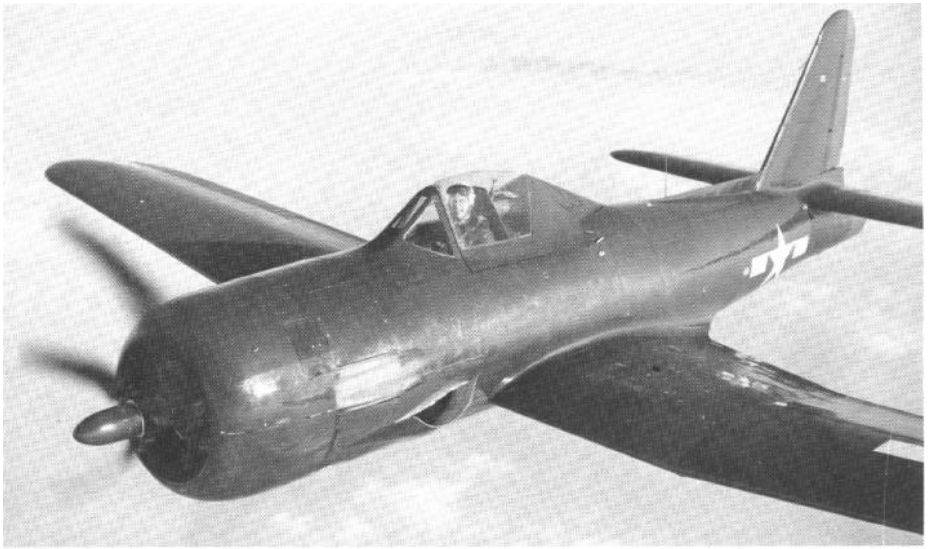
The first jet-powered patrol plane, the P4M-1 *Mercator,* flew in September 1946. It featured two nacelles, each housing a radial and a jet engine. Only 19 production models reached the fleet, beginning four years later. The aircraft weighed more than 83,000 pounds and had a top speed of 410 mph.



The Ryan XFR-4 Fireball had a reciprocating as well as a jet engine.

On October 30, 1946, Lieutenant Junior Grade A. J. Furtek became a jet-age hero. Assigned to the Naval Air Material Center to test ejection systems, he went aloft over NAS Lakehurst, N.J., in a JD-1 and was ejected out of the plane by two 600-grain powder charges by way of the British-designed Martin-Baker seat. The JD-1's altitude was 5,000 feet; speed, 250 mph. A fastener to the main chute which was attached to the seat fouled. Furtek fell 23 seconds to 1,500 feet but managed to detach himself from the seat and pull the rip cord of his own backup chute. Furtek was undismayed and the basic concept of the emergency egress system was considered valid. Ejectable cockpit capsules were also being considered, a technique used today on the USAF B-1 bomber and in NASA's space shuttles. However, ejection seats proved to be the most reliable and efficient means of escape from high-speed aircraft.

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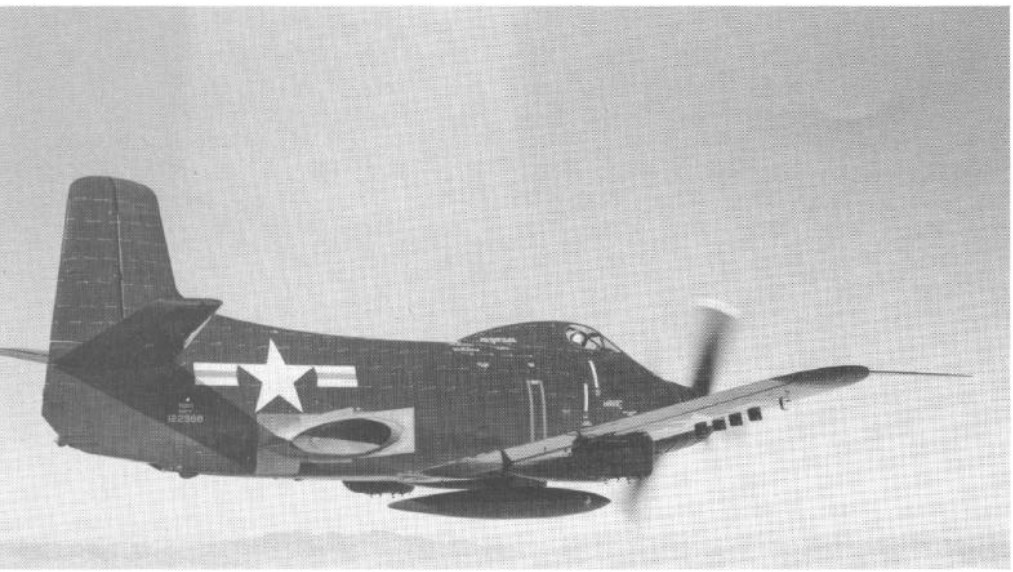
In a bit of understatement, an aviator observer in 1946 noted that "at very high speeds, the air flow over the wing and tail of an airplane begins to exhibit very perculiar characteristics." He was referring to the effects of compressability and similar factors about which comparatively little was known.

In many ways, airplanes were entering a dimension of the unknown. Much had to be learned. So, while jets flew in the subsonic regime, experimental efforts focused on the transonic and supersonic barriers. An example of these efforts was the D-558 *Skystreak.* The Douglas Company's Ed Heinemann and his design team combined with a small cadre of courageous test pilots and made landmark achievements operating from the desert runways of Muroc (later Edwards AFB), Calif. A straight-wing, red-colored experimental bird, the *Skystreak* weighed just under 10,000 pounds and flew for the first time in the spring of 1946. It continued a valuable series of flights that vastly expanded man's knowledge of high-speed, high-altitude aerodynamics. The aircraft was powered by a General Electric TG-180 turbojet which produced 4,000 pounds of thrust.

Meanwhile, the Bell Aircraft XS-1, developed for the Army Air Force, was contributing to the knowledge bank. Interestingly, some of its initial flights were made by Chalmers H. Goodlin, a former Navy pilot. The XS-1 was driven by four 6000-C4 rocket motors developed by the Navy and Reaction Motors located at the Naval Ammunition Depot in Dover, N.J. The engines burned ethyl alcohol and liquid oxygen at a rate which, at top speed, would consume four tons of fuel in two and a half minutes. Total thrust was 6,000 pounds. It was dropped from a B-29 mothership and achieved speeds of about 550 mph in early tests.

On November 11, 1946, Lieutenant Colonel Marion E. Carl, a legendary U.S.



The A2D Skyshark was a turboprop, attack aircraft. Reduction gear problems plagued the aircraft and, as a result, only seven were built.

Marine Corps pilot, flew a jet-propelled P-80A, making two catapult launches, four free takeoffs and five arrested landings aboard USS *Franklin D. Roosevelt.* These operations were part of carrier suitability tests that had begun in June 1945 with the delivery of P-80As to NAS Patuxent River, Md., site of flight test and evaluation work.

Carrier catapults were widely used during WW II for props and accommodated the new machines well. Catapults were considered the best answer to the slow acceleration problems of jet-powered aircraft. Also, in order for the jets to get aboard properly, landing signal officers were trained to issue the "cut" signal sooner in the groove because of some jets' floating tendency after the cut. Wave-offs had to be given quicker also to ensure adequate clearance altitude by the time the plane reached the ship.

The familiar warning emblazoned on flight deck bulkheads, BEWARE of PROPELLERS, was accompanied by the caution, BEWARE OF JET BLAST.

Some radical techniques were offered to alleviate flight deck handling problems. One system would elevate the hazardous jet blast from the tail section over the heads of deck handlers. It employed a jointed nose wheel which could be "broken" into an elbow after the plane had been removed from the arresting gear. Thus, the aircraft's nose would drop into a kneeling position, not unlike a bow to the audience. The tail would be raised enabling the plane to use its jet for taxiing without endangering personnel with blast effect. Another method used a deflector on the jet nozzle, forcing the blast upward away from scrambling deck crews.

The angled deck was years away. Existing barrier arrestment systems were designed to "catch" the big nosed props. Engineers developed a changeable system, one that could be modified to ensnare the main landing wheels of a jet but which could also be quickly shifted to act upon the engine of a conventional plane.

Since jets consumed much greater amounts of fuel, faster fueling methods had to be developed to keep turnaround times to a minimum. The Navy used regular aviation gasoline for its prop and jet turbines at the time. That would soon change and jet fuel would eventually require separate stowage cells aboard the carrier.

Jets stood lower to the ground, so rearming techniques had to be modified. Also, the limited endurance of jet planes demanded a more expeditious means of recovering and respotting them. Faster and more efficient tow tractors were needed to improve flight deck movements.

Maintenance of jet turbines and piston engines differed radically. Piston types required periodic checks, constant minor repair and parts replacement. However, the reciprocating engine had an advantage. It would operate for several hundred hours before it faced complete overhaul.

Jet power plants are much simpler and contain far fewer parts, facts which pleased the mechanics. Overall engine life at the time, however, was much shorter than that of the piston engines. Complete overhaul or engine change was needed after comparatively short periods of running time. On the plus side, such engine changes took much less time than with recips.

There were no jet trainers in 1947 but dual-seated types were high on BuAer's consideration list. Plans called for pilots to matriculate in the prop pipeline before moving up to jets.

McDonnell's XF2D-1 *Banshee,* later designated the F2H, flew for the first time on January 11, 1947. It resembled its *Phantom* predecessor but was powered by a pair of 24C Westinghouse turbojet engines, which provided 6,000 pounds of thrust, nearly twice as much as the *Phantom.*

Successor to the *Skystreak* was the D-558-II *Skyrocket.* Painted white for better visibility, it was designed to exceed the 680-mph speed of the earlier experimental plane. The *Skyrocket* was also powered by a Westinghouse 24C turbojet and a liquid rocket system manufactured by Reaction Motors, Inc. Fuel and landing gear were located in the fuselage instead of the wings as in the *Skystreak.* It featured swept-back wings and a jettisonable nose as a means of high-speed pilot escape. It had a photographic apparatus for recording flight instrument readings on motion picture film. Air pressure measurements were recorded automatically at 400 points on the wing and tail. Control forces and stresses in the structure were measured by more than 900 strain gages and oscillographs. The rocket motor had four cylinders that could be fired singly or together.

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Another landmark fighter was the XFJ-1 *Fury,* by North American, which had flown for the first time on November 27, 1946. The next year a prototype version of the *Fury* reached Mach 0.87, a record for U.S. fighters that lasted awhile.

Commander E. P. Aurand, C.O. of VF-5A, set a speed record in an FJ-1 on February 29, 1948, when he raced 9,450 miles from NAS Seattle to Los Angeles in one hour and 58 minutes. He averaged 550 mph en route, thus

breaking by 16 minutes the previous record held by a P-80. VF-5A's X.0., Lieutenant Commander R. M. Elder, set another record by flying from Seattle to Mills Field, San Francisco, in one hour and 24 minutes.

Aurand landed his straight-wing *Fury* aboard the flight deck of USS *Boxer* on March 10, 1948. This was the first time an operational squadron landed a jet aboard a carrier. Elder also participated and, together, the jet pilots garnered 24 landings and takeoffs.

The squadron was also the first jet fighter unit to serve at sea under operational conditions. Later versions of the FJ compiled an eventful history and were flown by Marine Corps squadrons as well.

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To facilitate interim familiarization training for fighter pilots (until Navy jets became available in quantity) the Navy procured 60 Lockheed P-80s from the U.S. Air Force and designated them TO-1s. Powered by the Allison J33, the TO-1s were not equipped with arresting hooks or catapult fittings. The initial group consisted of single-seaters but the plane, which was later designated the T-33, soon became a tandem-place aircraft ideal for training purposes. VF-6A received 24 of the *Shooting Stars* while a number went to the Marine Corps' VMF-311.

On March 23, 1948, John Cunningham of England established an altitude record flying a modified De Havilland *Vampire* powered by a Ghost jet engine. He reached 59,492 feet during the 47-minute flight aided by cabin pressurization that kept him comfortable.

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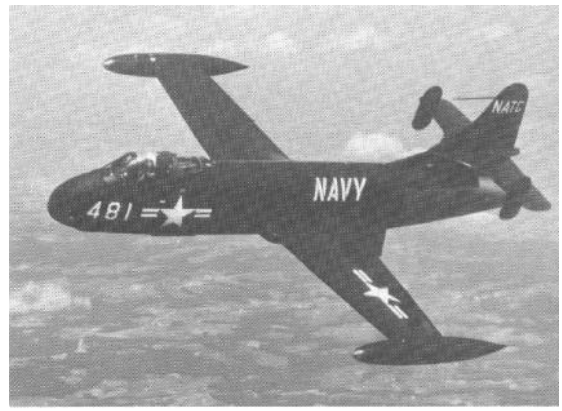
Early in the turbine age, the term "afterburner" meant a "fire built in the tail" of a jet. Chance Vought's F6U-1 *Pirate* had an afterburner system installed that provided a 30 to 50-percent increase in thrust. The afterburner system featured extension of the tailpipe into which fuel was injected and ignited. Enough unburned oxygen passed through the jet turbine and mixed with exhaust gases to permit combustion in the tailpipe. The burning took place behind the critical turbine blades where high temperatures existed without damaging moving parts. In the case of the *Pirate,* the afterburner system led to an eight-foot extention to the tailpipe.



An F6U-1 Pirate from NATC Patuxent River, Md., in 1950. The Pirate had an afterburner which enhanced thrust by 30 percent.

In June 1948, the Bureau of Personnel sent dispatches to cognizant commands concerning a "return to active duty" program for flyers (and some ground officers) who left the service at the end of the war. As a result, 2,600 Naval Air Reserve officers were recalled to active duty on one-year contracts. Meanwhile, in 1948, the Navy had planned new-pilot output of about 1,000, including Navy, Marine Corps, Coast Guard and foreign students. For 1949, a training quota of 2,300 midshipmen, aviation cadets and USN pilots was planned, more than doubling the overall effort to keep apace with the growing importance of aviation for military purposes. Jets were increasing in value and, in a way, so were the men who flew them.

The D-556-II Skyrocket carried jet-assisted takeoff (JATO) bottles, which were jettisoned from the aircraft after they burned out.